FINAL REPORT ON THE

DISCOVERY MANAGEMENT WORKSHOP

HELD AT THE
SAN JUAN CAPISTRANO RESEARCH INSTITUTE
APRIL 13-15, 1993

SUBMITTED BY
THE EXECUTIVE COMMITTEE

Frank A. Carr

W. E. Giberson

J. S. Martin

MAY 25, 1993

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FINAL REPORT ON THE

DISCOVERY MANAGEMENT WORKSHOP

Held At The
San Juan Capistrano Research Institute
April 13-15, 1993

1. OVERVIEW:

The Discovery Management Workshop (DMW) was chartered by Dr. Wesley T. Huntress, Director, Solar System Exploration Division (SSED), on February 1, 1993 to "consider management aspects of the Discovery Program, particularly the roles and relationships of the Principal Investigator and his or her institution, any industrial partner, any NASA Center[1] involved, and NASA Headquarters". The approach was to solicit the participation of two dozen experienced space program scientists, engineers, and managers from a wide spectrum of organizations and perspectives for a concentrated 3-day, focused, informal, and candid series of presentations and discussions. Attendance was by invitation only. An informal, "Executive Committee" consisting of F. A. Carr, J. S. Martin, and W. E. (Gene) Giberson was asked to plan and conduct the workshop in consultation with Dr. C. Pilcher, SSED. The DMW was held April 13-15, 1993, at the San Juan Capistrano Research Institute, ably supported by its Director, Doug Nash.

Because of the diverse familiarity of the participants with the Discovery Program, a package of background information was provided to them a month in advance. The workshop agenda was arranged to first bring everyone up to a common understanding by spending the first half-day receiving presentations from Dr. Carl Pilcher regarding the Discovery Program Goals and Objectives, and two speakers presenting "lessons learned" from SDIO-sponsored flight projects. (Unfortunately, GSFC was not able to attend to present their lessons-learned from the successful SMEX program.) A separate Subpanel, composed entirely of industry representatives and organized at the request of the Executive Committee by Al Schallenmuller of the Martin Company had met the previous week to discuss the same general Discovery topics

[1] JPL is considered a NASA Center in this report

and issues and the results from that Subpanel were presented. The 30-some DMW participants then assembled into two Subpanels, chaired by Jim Martin and Gene Giberson, and spent nearly two full days discussing and debating factors and issues generally associated with a) "The Up front Process" (usually called pre-Phase A, Phase A & Phase B), and b) "The Implementation Phase" (Phase C/D). Much of the final day was focused on the reports of each Subpanel which were presented in Vu Graph format to the full set of DMW participants.

Following the Workshop, the "Executive Committee" met for two days to consolidate the findings of the two Subpanels, many of which overlapped a good deal. A draft was forwarded to each participant for review and comment the results of which have been factored into the report that follows herein.

While the intended diversity of perspectives produced the predictable diversity of views among the Workshop participants,

> ***it is unmistakably clear that everyone unanimously and enthusiastically supports the Discovery concept and its goals; the notion of accomplishing valuable solar system exploration science in a faster, better, cheaper mode is seen by the Workshop participants as not only exciting, but realistic and achievable as well.***

SUMMARY OF "THE DISCOVERY PROGRAM"
(as Presented by C. Pilcher)

- "Discovery" is a series of low cost, planetary missions, with focused science objectives, and
  - Limited to $150M development cost each, ELV of Delta II or smaller
  - Level of effort @ ~$85M/yr analogous to the "Explorer" Program
  - MESUR Pathfinder and NEAR are current Phase A studies; subsequent Discovery missions are the subject of this workshop.

- Goals of Discovery are to
  - Increase flight rate and launch schedule certainty
  - Complement larger, less frequent missions
  - Increase involvement of Industry, Universities, & Students, and, public awareness in planetary missions

- Current planning envisions...
  - On-going advance mission concept studies
  - A maximum 1-year AO process
  - A definition phase, 1-2 years, for 3 Mission Concepts, and a down selection
  - A development phase not to exceed 36 months

- NASA Objectives for this Workshop
  - Further development of management approaches and concepts
  - Review of the Discovery Program Handbook
  - Exploration of relationships between various "players" in a Discovery mission

2. LIST OF KEY FINDINGS OF THE WORKSHOP:

- The concept, goals and objectives of Discovery (NTE $150M, 3-year development) are *terrific and achievable*
- Discovery should aim for one start and one launch per year, on-going
- Headquarters should *not* attempt to manage the Program alone
- A contract management and technical "oversight" office is needed.
- Most PI's will not wish to be "Project Manager" of their mission
- A few PI's do not wish to team with a NASA Center
- Most PI's will favor roles as mission architect and science leader.
- Most Universities have *neither the will nor the means* to accept sole responsibility for an entire mission.
- Use of "new technology" is supported--within the Discovery boundary conditions.
- The traditional AO process can be improved (quicker and cheaper, just as effective)
- Each bi-annual AO should select 3 missions for short Phase A's, then down-select for Phase B, and go into development only after criteria are met and reviewed.
- Be prepared to *cancel* any non-performing mission, in any Phase, A to C/D.
- Performing Criteria: good probability of valid science *within cost & schedule commitments*
- Every mission needs a credible: management plan, cost, schedule, & reserves
- Should have a fall back science floor (minimum acceptable objectives & capabilities)
- An approved *Project Plan* for each mission is a must.

3. SUMMARY OF SPECIFIC FINDINGS OF WORKSHOP [2]:

Since the Workshop was designed to bring together diverse views from a wide variety of perspectives, it is not surprising that spirited debate often occurred. Further, one would not expect that unanimity or even frequent consensus would be achieved, particularly on the thorniest issues. Having said that, we believe however that the workshop did converge toward a consensus on a number of points, and there was usually at least a prevailing view on other points. Unless specified otherwise, we feel that the following findings were the consensus or at least *prevailing* views of the Workshop; disagreements, or *minority* views will be indicated as such.

A fundamental finding of the Workshop is that the Discovery Program concept and goals are viable, realistic and rewarding.

3.1 Discovery AO Considerations

To demonstrate initiative and build Discovery momentum, HQ should plan for success and begin the AO preparation process *now,* and the entire process, through completion of selections should be completed in 10 months or less.

Subsequent AO's: to ensure scientific balance, it may be desirable to "customize" the "thrust" of each subsequent AO; this will also conserve scarce proposal dollars when certain scientific disciplines or areas are not likely to be high priority targets during a particular 2-year AO cycle.

The approach should be to retain the traditional strengths of the AO, but to add the rigor of traditional (spacecraft) RFP's by using two (equal) panels: a technical/management/cost panel as well as the scientific peer review panel.

The process should include the early issuance of a draft AO for comments. After the "final" AO is issued and proposals are received, all "unacceptable" proposals should be identified and eliminated from further consideration. Those remaining should be evaluated against criteria that takes management and cost into account on a par with science; finally,

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[2] This is an integrated composite of the two DMW Subpanel reports.

oral discussions and site visits should be considered to ascertain the capabilities of the Proposers.

Sample AO and Proposal Contents were developed with the goal of streamlining the process while providing substantive information upon which to intelligently base an evaluation.

A "model" contract might be included as a part of the AO. This would greatly facilitates NASA's ability to promptly complete negotiations at the conclusion of the selection process. (The contract should be for Phase A, with negotiated options for Phase B and Phase C/D.)

While the Discovery mission cap of $150M should be retained, proposers should be evaluated by taking life cycle costs into account (including pre-Project and MO&DA costs, Launch and TDA-unique costs, and NASA-supplied ELV costs). Cost guidelines should be provided in the AO.

3.2 Pre-Project Implementation Plan

An implementation plan was developed and supported almost unanimously by the participants. Its attributes are:

- Issue AO's every two years beginning 9/93
- Provide 7-10% pre-project funding
- Supports an annual new-start rate of 1 beginning FY' 96
- Select ~3 proposals for Phase A
- Keep Phase A & B duration short (e.g. 9 months)
- Authority To Proceed for Phase C/D based on a Formal Review of Phase B results

A schedule and first order funding level reaching $14M per year[3] in FY' 95 was derived, and is shown in Figure A. The Workshop participants strongly endorse this plan as being aggressive, affordable, *and achievable.*

[3] Excluding development funding

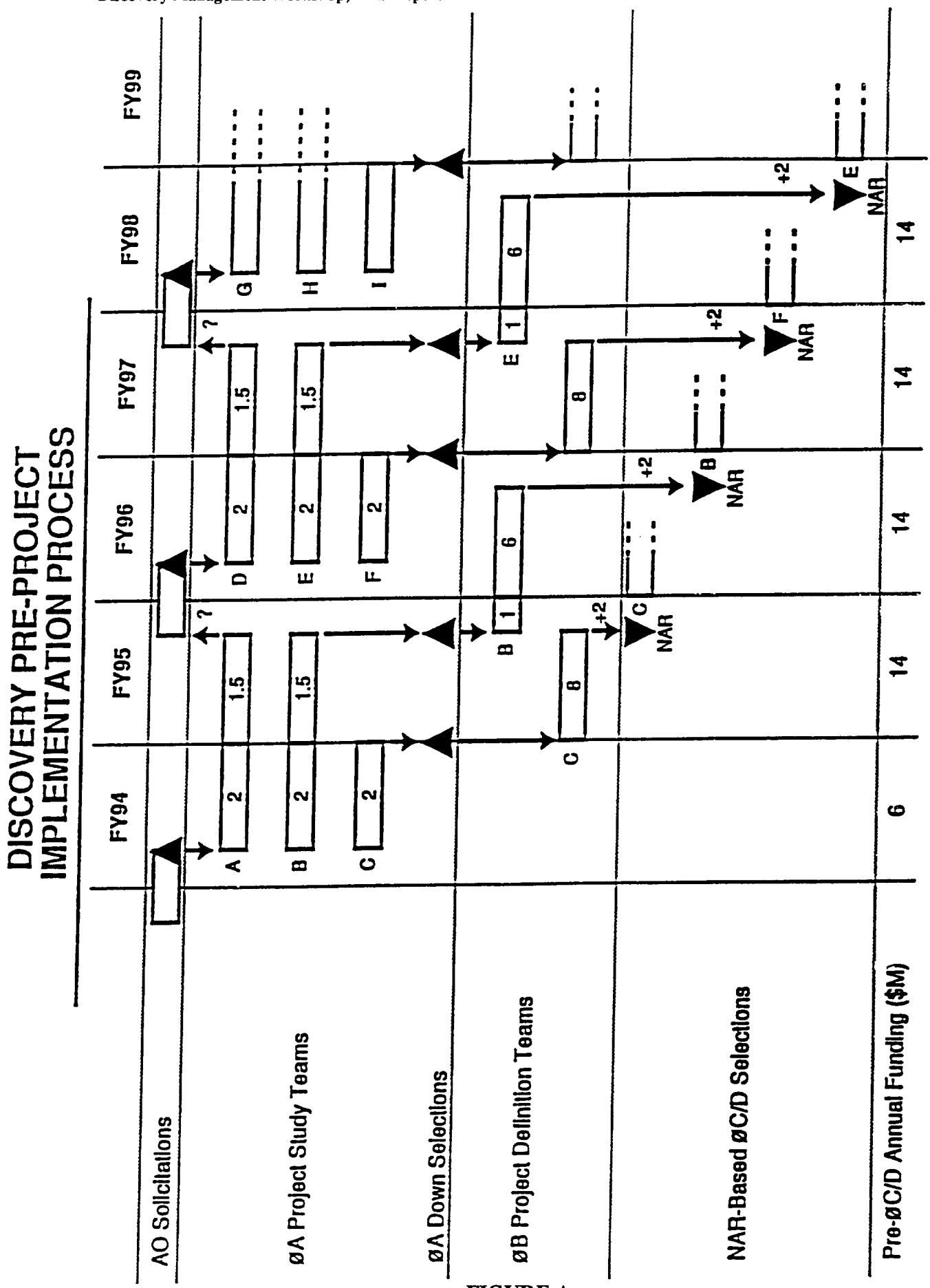

FIGURE A
Page 5.1

"Definition" and "Preliminary Design" Phases could be performed as illustrated in the following example:

- Select 3 missions for 9 month Definition Phase (Phase A in this example...Ed..)
- Perform mission design and feasibility, prepare implementation and management plans, and preliminary cost estimate
- Conclude with a formal HQ review of design, implementation, and cost, for the purpose of making a *continuation decision*.. At this point a single team would proceed into preliminary design phase(i.e., Phase B) of 9-12 months duration, at the conclusion of which a Mission Design/Phase C/D start/continuation review would take place
- The Workshop further recommends reviews approximately every year tied to a proposed critical event such as PDR, CDR, for the purpose of making a *continuation* decision.
    - To review & assess end-to-end performance (technical, cost, schedule)
    - Cancel mission in a timely fashion if no reasonable probability of success within agreed resources constraints

3.3 Discovery Program Organization

This was a far ranging discussion without final agreement nor consensus regarding a particular organizational approach for the program. However, the following points were clearly the prevailing workshop view:

The role of NASA HQ and the Program Manager should be retained basically in its present form, i.e., HQ should not attempt to enhance the role of the program manager to provide contract management and technical oversight.

The PI should be responsible for developing an organizational approach (e.g. a teaming arrangement or "consortium") consisting of one or more groups, as appropriate, from Universities, NASA Centers, FFRDC's, and Industry, to implement his/her proposed mission.

A NASA Center/JPL "Oversight Office" should exist organizationally between HQ and the PI's "management consortium"; this "Oversight Office" might be different for each

Discovery Mission (no agreement), but in any event its form and charter would be a HQ decision. The main point is that HQ cannot contract for or manage each Discovery Mission, but that NASA should be prepared to provide limited oversight of Discovery Missions (general agreement).

This responsibility for contractual management and technical oversight could be assigned to JPL or a NASA Center that has an *institutional interest* in planetary exploration. Headquarters is responsible for assigning the responsibility for this management and oversight function, which is a separate and distinct function from any implementation, or mission management task.

In those cases where a PI elects to team with a NASA Center for Project Management, as well as with the same Center to be a supplier of a portion of the proposed effort (e.g. to purchase the spacecraft), the PI should develop an MOU for the Proposal with the Director of the NASA Center that covers the assignment of responsibilities and allocation of resources. (Ed. Note: This was a somewhat controversial finding because in effect the PI becomes both a customer and a vendor relative to the Center.)

Goal: Make Discovery Visible and effective within NASA

Discovery Program Office should be established immediately. (Note that no agreement was reached about the appropriate level of this office, other than it should be separate and visible...Ed)

- Provides stability and continuity (i.e., long term nature of program, 10-20 years, suggests an "institutional" rather than program organization).
- Ensures success in the "Faster, Better, Cheaper" world
- Structure of Program Office:
    - Located at HQ, and small, i.e., perhaps 2-6, headed by Program Manager, possibly recruited from outside NASA
    - With broad skills in areas of science, management, engineering, procurement

Roles of HQ Program Office (General agreement on roles but considerable pessimism regarding success in the HQ environment...Ed.):

- Facilitate interfaces with NASA offices & External Agencies
- Advocate vigorous program of 1 launch per year
- Expedite critical decisions and mission selections
- Establish & maintain stable environment and funding profile and continuity
- Expedite procurement and funding for selected missions
- Oversee development, progress, funding & spending profiles for ongoing missions
- Interact closely with science community--through a small, standing advisory group

3.4 PI Roles/Responsibilities/Relationships

The Workshop found that it now appears that, with a very few exceptions, Universities are *unlikely to be willing* to contract for full mission responsibilities in support of their PI's.

The PI is expected to:

- Propose, and implement if selected, a management plan that addresses his/her mission and the responsibilities of the PI, the Project Manager, and other key personnel.
- Form a team among a NASA Center, Industry, an FFRDC, and scientists that will deliver the entire mission,
- Delegate authority as appropriate
- Appoint or concur in the appointment of key personnel
- Approve key documents, budgets, key trade offs, and major expenditures
- Chair the Science Team
- Make appropriate time commitments

- Preserve the Scientific integrity of the mission
- Report to HQ via some (TBD) mechanism

The Workshop saw the role and responsibility of the PI as a crucial factor in the success of the mission; it must be carefully and thoroughly designed to provide a viable means for the successful preservation of mission science *and* the implementation of the mission. Management continues to be a key consideration.

3.5 Funding By HQ?

Can Missions be funded and managed directly from HQ without the services of a NASA Center?

- There is no savings associated with a contract managed at Headquarters versus a Field Center.

- There may be some savings versus contracting from JPL, the "JPL 12% overhead factor" on procurements being cited as an example.

- HQ should not require that all missions be managed by a NASA Center (Clear lack of consensus on this point...Ed.)

- HQ should find ways of funding PI's directly (Lack of consensus on this point also, with some vigorous beliefs that it is unrealistic to contract directly from HQ to the PI's).

3.6 International participation

- It was noted that International partnerships can be risky, that the PI should be US, that NASA should be able to unilaterally terminate the mission, and that International participation should be less than the NASA participation.

- International Discovery missions should be capped at $150M to NASA and limited to 36 months.[4] However, those that reduce the mission cost below $150M are encouraged.

- International Discovery missions should be small independent free-flyers and not large NASA science instruments to be flown on large international platforms or spacecraft.

3.7 Use of New Technology in the Discovery Program

While mission success is recognized as a high priority...

- Introduction of new technology must be driven by mission objectives

- *Innovative engineering approaches and use of new technology to enhance the value of a Discovery mission is encouraged* and a new technology emphasis for smaller, Pegasus-class payloads is supported.

- The use of new and advanced technologies to meet the goals of the Program is desirable.

- In the above cases, the proposal (and Project Plan) must include a risk assessment and a plan to address the risk. A "fall-back" plan could involve, for example, reverting to "older" technology, descoped science objectives, mass growth, etc.

- Code C funding should be considered to support new technology for Discovery missions.

3.8 Risk

Mission success ***within agreed cost and schedule boundaries*** must be the overriding priority. Missions must be designed and scoped to emphasize mission success within cost and

[4] A minority view indicated that International proposals could have an unfair advantage under these arrangements, since they could be scoped at $299.9M thus appearing to be more "attractive" than the capped $150M US proposals.)

schedule constraints. A mechanism should be in place to permit NASA to quickly cancel a mission that is not conforming to cost and schedule constraints.

Moderate mission risk can be acceptable, and...

- NASA should avoid the imposition of arbitrary (e.g. parts) requirements
- the PI should plan and justify his risk approach

RISK applies to cost, schedule and performance parameters

- Only performance is unconstrained by Discovery approach
- Cost and schedule contingency should be proposed and evaluated on the basis of credibility and risk
- *Performance resiliency* must be considered

Performance resiliency implies the following considerations:

- A science "Performance Floor" should be required from the PI, below which the mission is no longer justifiable on scientific and economic grounds.

- Proposal should include prioritized list of measurement objectives constituting the "Performance Floor", and, above the floor up to "Full Mission Objectives".

    - Options for "graceful degradation" should be proposed
    - A termination review would be triggered if anticipated performance drops to the Performance Floor (Note: tentative agreement, pending more definition).

4. KEY POINTS FROM INDUSTRY SUBPANEL of April 6, 1993:

Ed. Note: These views are summarized from the Presentation by Al Schallenmuller who organized and conducted the Subpanel; because of time constraints, they were not significantly discussed by the Workshop.

Organization & Management (See Organization Chart, Appendix E):

NASA HQ should:

- Provide interface with the Congress

- Solicit new mission concepts
- Administer the AO process
- Expect to secure help for technical reviews (oversight)
    - Note that NASA Centers may have "conflicts of interest"
    - May have to hire support contractors, with bid-exclusion provisions
- "Contract" with a "Responsible Organization" for each mission
- limit management and technical oversight to 5-8 people

The "Responsible Organization" could be:

- A University (but often lacks Project Management experience and may have limited technical resources)
- A NASA Center (but may have unfair advantage; little incentive to control costs, typically does "business as usual", would require the NASA Administrator to direct a "New Way of Doing Business").
- Industry (which has infrastructure in place, management strength, a technology base, and profit incentives for motivating to control costs), or
- A National Laboratory (i.e., an FFRDC).

The Project Management Office...

- is staffed/hired by "Responsible Organization"
- includes Project Manager, PI, admin. support
- procures, administers contracts for instruments, spacecraft, GDS,
- obtains network support
- integration (of the project elements)

Assuming one $150M mission per year, the total net funding requirements are calculated to be $162M/year including the seed money for advanced mission studies, 3 teams for 1 year definitions at $1m each, plus one team for a second year of definition at $9m. And, the typical annual development profile should be $30/80/40m.

Risk Reduction contracting requires...

- Well defined requirements with freeze at NAR

- Pre-NAR invest 7-8% of contract + IR&D from contractors
- *Consistent* funding profile
- Don't pick fixed price contracts and assume everything will be okay; consider FFP if really "off-the-shelf".
- Continue to make mission selections on schedule

Contract type considerations...

- Favor incentive fee arrangement with split between cost, schedule and mission success, with easy to interpret incentives, and >100% of target fee for under-run, ahead of schedule and greater data return. Sample incentive fee curves provided as illustrations.

- Not in favor of award fee contracts (too much subjectivity and too much time and effort to administer), or fixed price (unless development risk is known to be low).

Should PI select spacecraft contractor? (yes)

- The "Responsible Organization" of the PI should be responsible for the selection.
- Teams formed for proposal, competitive or sole source
- NASA has 3 opportunities to evaluate spacecraft contractor:
  - During advanced studies
  - From AO process
  - At down-select, from 3 teams to 1 team

Conduct a *minimum of reviews* with NASA board restricted to 6-9 members....

- NAR/System Requirements Review = freeze, sign Project Plan
- PDR (2 days), covering instruments, s/c, GDS plus cost & schedule performance
- CDR (2 days), same scope as PDR
- Launch Readiness (2 days)

New Technology: Introduce, but reduce risk with Up-front money:

- Pre-project funding of $10 million
- Study and Contractor IR&D funds
- Code C Technology development support

Use of Government Specifications and Standards--do not mandate

- Teams should propose what they think makes sense for mission and risk level
- Evaluators should judge accordingly

Mission Selection Criteria should include:

- Science value
- Cost, schedule and technical risk
- Consideration of total life cycle cost
- Accountable milestones to measure progress versus spending

5. KEY POINTS FROM SDIO PROGRAM PRESENTERS:

SDIO found it is possible to achieve launch times of 12-18 months from go-ahead and still follow all procurement regulations, FAR's, etc. For example, programs can place orders on existing contracts, or utilize sole source procurements often without RFP's, CBD's and such; also many steps and customs that have developed within the procurement process--and which take time and add cost--can be eliminated; lastly, a way should be found to have the Contacting Officer become a team player, working for, rather than against, the program schedule.

SDIO seeks the lightest weight designs and smallest ELV with standardized payload interfaces to save cost; they believe that reducing weight reduces cost. The mission is limited to essentials, latest technology is used.

SDIO missions appear to be performed on the basis of specified cost and a "flexible" definition of mission success, since the technology demonstration is the primary project goal.

A centralized, very small Program Office is used; they do not require consensus to make decisions. They obligate 100% of each FY funding *up front* to the implementing organization, do not believe what the PERT charts say but instead visit the development sites (they do not

have travel dollar problems). Another management technique is to constantly focus on ETC rather than monthly "deltas from plan" because control of the end item cost is the objective.

They exploit quantity parts buys, use commercial grade parts at times to save up to 100 times the cost; they freeze the design early, use some redundancy, resist science enhancements, and they build engineering units, mass simulators, and engineering spacecraft all of which leads to design maturity before the flight items are delivered. They do rely on testing , but do not subject the hardware to excessive test levels.

They sometimes use a "Hardware Acquisition Team", consisting of both technical and procurement people whose explicit charter is to acquire the hardware. Often they bought what was available (saving time and dollars) and modified requirements accordingly--a radical departure from typical requirements-driven hardware designs and buys. In other words, they avoided "minor mods to improve" what already existed.

APPENDIX A
DISCOVERY MANAGEMENT WORKSHOP
PARTICIPANTS (ALPHABETICAL)

FIRST NAME	LAST NAME	ORGINIZATION	REPRESENTING
Steve	Bailey	NASA JSC	Project Mgmt
Phil	Barnett	JPL	Project Mgmt
Charlie	Barth	Univ-Colo	Science
Steve	Battel	Consultant (Battel Engrg)	Project Mgmt
Mike	Belton	Univ-Kitt Peak	Science
Bob	Bless	Univ-Wisconsin	Science
Al	Boggess	Retired-NASA	Science
Bill	Boynton	Univ-Arizona	Science
Geoff	Briggs	NASA Ames	Science
Jim	Campbell	NASA HQ/JPL	Pgm Mgmt (HQ)
Frank	Carr	NASA Ret/JPL	Project Mgmt
Dan	Cathcart	NASA Ames	Procurement
Andrew	Cheng	FFRDC-APL	Science
Tom	Coughlin	FFRDC-APL	Project Mgmt
Gary	Coulter	NASA HQ	Pgm Mgmt (HQ)
Charles	Elachi	JPL	Science
Gene	Giberson	Retired-JPL	Project Mgmt
Richard	Goody	Univ-Harvard/JPL	Science
Charlie	Hall	Retired-NASA	Project Mgmt
Scott	Hubbard	NASA Ames	Project Mgmt
Jack	Lowe	Univ-Cornell	Univ Admin
Jim	Martin	NASA Consultant	Project Mgmt
David	Morrisroe	Univ-Cal Tech	Univ Admin
Doug	Nash	SJCRI	Workshop Host
John	Neihoff	NASA Support (SAIC)	Project Mgmt
Steve	Paddack	NASA GSFC	Project Mgmt
David	Paige	Univ-UCLA	Science
Carl	Pilcher	NASA HQ	Pgm Mgmt (HQ)
Don	Pinkler	NASA HQ	Pgm Mgmt (HQ)
Connie	Poole	NASA HQ	Procurement
Buz	Sawyer	NASA HQ (Q)	R&QA
Tony	Spear	JPL	Project Mgmt
Rob	Staehle	JPL	Project Mgmt
Alan	Steed	Univ-Utah State	Univ Admin
Randy	Taylor	JPL	Procurement
Joe	Veverka	Univ-Cornell	Science
Richard	Vorder Bruegge	NASA Support (SAIC)	Pgm Mgmt (HQ)
Jim	Wheeler	Univ-Arizona	Univ Admin

APPENDIX A (Cont'd)
DISCOVERY MANAGEMENT WORKSHOP
ATTENDEES (By Functional Area)

REPRESENTING	FIRST NAME	LAST NAME	ORGINIZATION
Workshop Host	Doug	Nash	SJCRI
Univ Admin	Jack	Lowe	Univ-Cornell
Univ Admin	David	Morrisroe	Univ-Cal Tech
Univ Admin	Alan	Steed	Univ-Utah State
Univ Admin	Jim	Wheeler	Univ-Arizona
Science	Charlie	Barth	Univ-Colo
Science	Mike	Belton	Univ-Kitt Peak
Science	Bob	Bless	Univ-Wisconsin
Science	Al	Boggess	Retired-NASA
Science	Bill	Boynton	Univ-Arizona
Science	Geoff	Briggs	NASA Ames
Science	Andrew	Cheng	FFRDC-APL
Science	Charles	Elachi	JPL
Science	Richard	Goody	Univ-Harvard/JPL
Science	David	Paige	Univ-UCLA
Science	Joe	Veverka	Univ-Cornell
R&QA	Buz	Sawyer	NASA HQ (Q)
Project Mgmt	Steve	Bailey	NASA JSC
Project Mgmt	Phil	Barnett	JPL
Project Mgmt	Steve	Battel	Consultant (Battel Engrg)
Project Mgmt	Frank	Carr	NASA Ret/JPL
Project Mgmt	Tom	Coughlin	FFRDC-APL
Project Mgmt	Gene	Giberson	Retired-JPL
Project Mgmt	Charlie	Hall	Retired-NASA
Project Mgmt	Scott	Hubbard	NASA Ames
Project Mgmt	Jim	Martin	NASA Consultant
Project Mgmt	John	Neihoff	NASA Support (SAIC)
Project Mgmt	Steve	Paddack	NASA GSFC
Project Mgmt	Tony	Spear	JPL
Project Mgmt	Rob	Staehle	JPL
Procurement	Dan	Cathcart	NASA Ames
Procurement	Connie	Poole	NASA HQ
Procurement	Randy	Taylor	JPL
Pgm Mgmt (HQ)	Jim	Campbell	NASA HQ/JPL
Pgm Mgmt (HQ)	Gary	Coulter	NASA HQ
Pgm Mgmt (HQ)	Carl	Pilcher	NASA HQ
Pgm Mgmt (HQ)	Don	Pinkler	NASA HQ
Pgm Mgmt (HQ)	Richard	Vorder Bruegge	NASA Support (SAIC)

APPENDIX A (Cont'd)
DISCOVERY MANAGEMENT WORKSHOP
ATTENDEES (By Orginization Type)

ORGINIZATION	FIRST NAME	LAST NAME	REPRESENTING
Consultant (Battel Engrg)	Steve	Battel	Project Mgmt
FFRDC-APL	Tom	Coughlin	Project Mgmt
FFRDC-APL	Andrew	Cheng	Science
JPL	Randy	Taylor	Procurement
JPL	Phil	Barnett	Project Mgmt
JPL	Tony	Spear	Project Mgmt
JPL	Rob	Staehle	Project Mgmt
JPL	Charles	Elachi	Science
NASA Ames	Dan	Cathcart	Procurement
NASA Ames	Scott	Hubbard	Project Mgmt
NASA Ames	Geoff	Briggs	Science
NASA Consultant	Jim	Martin	Project Mgmt
NASA GSFC	Steve	Paddack	Project Mgmt
NASA HQ	Gary	Coulter	Pgm Mgmt (HQ)
NASA HQ	Carl	Pilcher	Pgm Mgmt (HQ)
NASA HQ	Don	Pinkler	Pgm Mgmt (HQ)
NASA HQ	Connie	Poole	Procurement
NASA HQ (Q)	Buz	Sawyer	R&QA
NASA HQ/JPL	Jim	Campbell	Pgm Mgmt (HQ)
NASA JSC	Steve	Bailey	Project Mgmt
NASA Ret/JPL	Frank	Carr	Project Mgmt
NASA Support (SAIC)	Richard	Vorder Bruegge	Pgm Mgmt (HQ)
NASA Support (SAIC)	John	Neihoff	Project Mgmt
Retired-JPL	Gene	Giberson	Project Mgmt
Retired-NASA	Charlie	Hall	Project Mgmt
Retired-NASA	Al	Boggess	Science
SJCRI	Doug	Nash	Workshop Host
Univ-Arizona	Bill	Boynton	Science
Univ-Arizona	Jim	Wheeler	Univ Admin
Univ-Cal Tech	David	Morrisroe	Univ Admin
Univ-Colo	Charlie	Barth	Science
Univ-Cornell	Joe	Veverka	Science
Univ-Cornell	Jack	Lowe	Univ Admin
Univ-Harvard/JPL	Richard	Goody	Science
Univ-Kitt Peak	Mike	Belton	Science
Univ-UCLA	David	Paige	Science
Univ-Utah State	Alan	Steed	Univ Admin
Univ-Wisconsin	Bob	Bless	Science

APPENDIX B

AGENDA
DISCOVERY MANAGEMENT WORKSHOP
APRIL 13-15, 1993

DAY	TIME	TOPIC	LEAD	ALLOTTED	NOTES
Tue	0800	Welcome	Nash	15 min	Logistics, etc.
	0815	Workshop Purpose, Goals, & Process	Carr	15	
	0830	***DISCOVERY*** Program & Goals	Pilcher	30	
	0900	The GSFC SMEX Experience & Views	(Cancelled)	30	What, How managed, & lessons learned
	0930	The SDIO Experience	Stu Nozette	45	ditto
	1015	The JPL MISTI Experience	Kane Casani	30	ditto
	1045	Break	Nash	15	
	1100	Industry Subpanel Report	Schallen-muller	60	
	1200	Lunch-Local area restaurants		60	
	1300	Subpanel Sessions #1	Giberson & Martin	4 hrs	Two Locations
	1700	Adjourn	"		
	1900	*Mixer*	Nash	90	@ SJCRI
Wed	0800	Full Panel Tag-up	Carr	30	Short Joint Session
	0830	Subpanel Sessions #2	Martin & Giberson	3.5 hrs	Two Locations
	1200	Lunch-local area		60	
	1300	Subpanel Sessions #3	Martin & Giberson	4 hrs	Two Locations
	1700	Adjourn	"		

DAY	TIME	TOPIC	LEAD	ALLOTTED	NOTES
Thur	0800	Prep of Subpanel Reports & Splinter Sessions as needed	Martin & Giberson	4 hrs	no Joint Sessions
	1200	Lunch-local area		60min	
	1300	"Subpanel-A Presentation-including discussion and "Minority Reports", if any	Martin	2 hrs	Joint Session
	1500	Break	Nash	15 min	
	1515	"Subpanel B Presentation-including discussion and "Minority Reports", if any	Giberson	2 hrs	Joint Session
	1715	Close	Carr & Pilcher	45	Joint Session
	1800	Adjourn			